## REMARKS

## AMENDMENT TO THE SPECIFICATION

The paragraph on page 13, lines 10-24 has been amended to indicate that the posterior probability provides the probability of a clean speech log magnitude vector given the noisy speech <u>filtered</u> log magnitude vector. This amendment does not add new matter because those skilled in the art would have understood from the previous sentence that the posterior probability was based upon the filtered log magnitude vector. In particular, the previous sentence indicates that "The filtered log magnitudes are provided as a vector of magnitude values to a posterior calculator 314, which computes a posterior probability for the vector at step 410."

## SECTION 101 REJECTIONS

## REJECTION UNDER 35 U.S.C. §101

In the Final Office Action, claims 12-20 were rejected under 35 U.S.C. §101 because the claims were said to be directed to non-statutory subject matter. In particular, claims 12-20 were rejected because Applicant's description of computer-readable media included magnetic carrier waves.

With the present amendment, claim 12 has been amended to change "computer-readable medium having" to "computer-readable storage medium storing." In the specification on page 6, lines 3-5, computer-readable media was said to comprise computer storage media and communication media. Computer storage media was further said to include RAM, ROM, EEPROM, flash memory or other memory technology, CD-ROM, digital versatile disks (DVD) or other optical disk storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or other media which can be used to store the desired information and which can be accessed by computer 110. (See page 6, lines 10-18). Communication media, on the other hand, were said to include instructions and data structures in a modulated data signal such as a carrier wave or other transport mechanism. (See page 6, lines 18-23). Thus, in the specification, a distinction is made between computer-readable storage media and computer-readable communication media with computer-readable storage media being directed to tangible computer-readable media and communication media said to include carrier waves. Since a

computer-readable storage medium is directed to a tangible computer-readable medium and not carrier waves, the amendments to claim 12 exclude communication media, such as carrier waves, and thus make claims 12-19 statutory.

## SECTION 102 AND 103 REJECTIONS

Claims 1-7 and 9-20 were rejected under 35 U.S.C. §102(b) as being anticipated by Ephraim (IEEE Publication, A Bayesian Estimation Approach for Speech Enhancement Using Hidden Markov Models). Claim 8 was rejected under 35 U.S.C. §103(a) as being unpatentable over Ephraim.

### CLAIMS 1-6 AND 8-11

Claim 1 provides a method of identifying a clean speech signal from a noisy speech signal. Under the method, a set of log-magnitude frequency values are identified for each of a plurality of frames that represent the noisy speech signal. The log-magnitude frequency values of the noisy speech signal are filtered to smooth the log-magnitude frequency values over time to form filtered noisy values. Parameters of at least one posterior probability distribution of at least one component of a clean signal value are determined based on the set of filtered noisy values without applying a frequency-based transform to the set of filtered noisy values. The posterior probability distribution provides the probability of a log-magnitude frequency value for a clean speech signal given a filtered noisy value. Using the parameters of the posterior probability distribution, an estimate of a set of log-magnitude frequency values for a clean speech signal is formed.

The amendments to claim 1 find support in the specification on page 13.

As amended, claim 1 is not shown or suggested in Ephraim. In particular, Ephraim does not filter log-magnitude frequency values of a noisy speech signal to smooth the values over time and does not determine parameters for a posterior probability distribution based on such filtered noisy values.

In the Office Action, Ephraim was said to show time-based filtering in the left-hand column of page 731. Applicants respectfully dispute this assertion.

In the left-hand column of page 731, Ephraim describes applying a harmonic mean of Wiener filters to estimate a clean speech value $y_t$ from a noisy speech value $z_t$. Thus, the Wiener filters on page 731 are not filtering the noisy signal to smooth the noisy signal over time to form filtered noisy values but instead are filtering the noisy signal to produce a clean signal $y_t$. Further, the clean signal $y_t$ formed through the filtering of the Wiener filter in Ephraim is not used to determine parameters of at least one posterior probability distribution.

The Office Action also cited the MMSE estimation of page 28 as showing a filtering of values over time and using such filtered values to determine a posterior probability. Applicants respectfully dispute this assertion.

The filters discussed on page 728 are also Wiener filters, which are applied to a noisy feature vector $z_t$ to form a clean feature vector $y_t$. Thus, the filters are not being used to smooth log magnitude frequency values over time to form filtered noisy values, but instead are used to form clean speech values from noisy speech values.

Since Ephraim does not show or suggest producing filtered noisy speech log magnitude vectors or using such filtered noisy vectors to determine a posterior probability, it does not show or suggest the invention of claim 1 or claims 2-6 and 8-11, which depend therefrom.

## CLAIMS 12-19

Independent claim 12 provides a computer-readable storage medium storing computer-executable instructions for performing a series of steps. The steps include applying logarithms of frequency values that represent frames of a noisy speech signal to time-based filtering to produce filtered values representing noisy speech. A posterior probability is determined based on the filtered values wherein a frequency-based transform is not applied before the filtered values are used to determine the posterior probability and wherein the posterior probability provides the probability of frequency values for a clean speech signal given the filtered values. The posterior probability is then used to estimate a frame of a clean speech signal.

As amended, claim 12 is not shown or suggested by Ephraim. In particular, Ephraim does not apply time-based filtering to logarithms of frequency values to form filtered values representing noisy speech. Instead, in each of the filtering examples cited in the Office Action, the filtering produces clean speech by applying a Wiener filter to the noisy speech. In addition, Ephraim does not use the resulting filtered values to determine a posterior probability that provides the probability of frequency values of a clean speech signal given the filtered values. As such, Ephraim does not show or suggest the invention of claim 12 or claims 13-19, which depend therefrom.
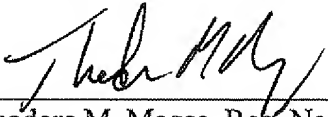
## CONCLUSION

In light of the above remarks, claims 1-6 and 8-19 are in form for allowance. Reconsideration and allowance of the claims is respectfully requested.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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